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ABSTRACT

The impact of an introductory library skills course is evaluated through the use of a difference of means test, the t-test for significance. The purpose of the course is to provide a basic introduction to the efficient and effective use of academic libraries and their resources. Each of 55 undergraduates was pretested to determine his/her entry level of expertise. The test and the course covered eight competency areas: terminology, card catalog, subject heading, heading arrangement, reference materials, biographical information, choice of index, and periodical indexes. At the conclusion of the semester, students completing the course were retested using the identical test supplemented by an attitudinal test for feedback. The paper closes with a brief discussion of suggested improvements for both the course and the evaluation tool. (Author/RAA)

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MEASURING THE EFFECTIVENESS OF A LIBRARY SKILLS PROGRAM

by

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The impact of an introductory library skills course is evaluated through the use of a difference of means test, the t-Test for significance. The purpose of the course is to provide a basic introduction to the efficient and effective use of libraries and their resources, specifically the research library at the University of Missouri-Columbia. The course offers elementary instruction in the bibliographic research process and identification of those resources relevant to basic library research. Self directed and based on the workbook approach to learning, the class meets weekly to discuss completion of assignments from that workbook.

Fifty-five beginning undergraduates preregistered for the one credit hour skills course, and each was given a pretest with the objective of measuring the student's level of library expertise prior to the course instruction. The test and the course cover the following eight areas of competence:

I. definition of basic terminology
II. use of information from the card catalog
III. choice of subject headings
IV. arrangement of headings
V. literature reference materials
VI. sources of biographical information
VII. choice of indexes
VIII. use of periodical indexes

At the end of the fifteen week semester, those students completing the course were tested over those same eight areas of skills, using the identical test utilized for pre-test purposes. The t-Test model was set up and the value computed for each pre-post pair of grades for each student in the attempt to identify those successes and failures of the skills course with regard to its stated objectives. The aggregate scores were also broken down into scores on each of the eight categories in the attempt to single out those areas where improvements are needed. An attitudinal test was also utilized to provide a feedback channel from the students to the instructors and designers of the course. The paper closes with a discussion of the suggested improvements for both the course and the evaluation tool.

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I. Introduction

The implementation of library skills programs in academic and research settings has increased during the past decade. Reasons for this reemergence of bibliographic instruction programs stem from those perceptions of both academic librarians and faculty that both entry level students and graduate level students have failed to master those skills necessary for the successful use of those resources which libraries have to offer. In response to this felt need, librarians and library educators have joined forces in initiating basic skills courses in library research, most of which appear to be aimed at the incoming undergraduate in the new academic environment.

A common concern shared by designers of such courses is the continued improvement of, and the continued viability of, the instructional skills course. Evaluative studies which attempt to guage the impact of such designs serve to enhance both improvements and viability. This it would seem imperative that library skills instructors focus on the impact which their course has had on the user of the library, so as to be in a better position to justify or improve upon such a course. Evaluation aimed at measuring overall effectiveness of a program is often referred to as summative evaluation, while those measures aimed at continued improvement of course design are referred to as formative evaluation. Both measures are recommended in assessing the impact of a course in bibliographic instruction.

II. The Skills Program

The particular program to be described was developed by the library staff and the Library Science faculty at the University of Missouri-Columbia. The first attempt at instruction began fall semester, September 1979, with a university wide offering to all levels of undergraduates enrolled for that semester. Seventy-seven percent of the fifty-five students were incoming freshmen, many encouraged by their advisors or English instructors to undertake the instruction. At the outset of the course (actually the second meeting) a pre-test was administered in the attempt to establish a baseline level of library expertise for each of the 55 students. The test focused on the following eight areas of competence:

I. definition of basic terminology
II. use of information from the card catalog
III. choice of subject headings
IV. arrangement of subject headings
V. literature reference materials
VI. sources of biographical information
VII. choice of indexes
VIII. use of periodical indexes

Each area of questionning corresponds to a specific objective of the skills course, that is the improvement of library competence in that area.

The course itself was designed to incorporate the self instruction mode of education. The basic text is an internally designed workbook, divided into chapters for which individual assignments have been prepared. The assignments are based solely on the contents of the respective chapters and require actual use of the local university library.

At the end of the fifteen week semester, those students completing the course were tested again over those same eight areas of competence, using the identical test utilized for pre-test purposes. Since the pre-tests were not returned to the students, and the corrent answers were never revealed, the chances of any student retaining correct answers of any of the test questions was assumed to be minimal. An attitudinal questionnaire was also designed to provide a feedback channel from the students to the instructors and designers of the course.

III. The Impact Model-Summative Evaluation

The impact of the course can be quantitatively assessed by testing for a significant difference between the means (arithmetic averages) of the two related samples, one the pre-test exam scores, the other the post-test scores. With a sample size of 55 one can use the t-Test for the difference of means between two related samples to measure the impact of the course offering on the ability to conduct library research.

Briefly, the difference between the pre and post scores for each student is computed (D_i), summed up, and divided by the total sample size (55) to arrive at the mean difference ($\bar{D}$). Then the individual score deviations, or the difference between each raw difference and the mean difference ($D_i - \bar{D}$), is computed. The sum of the squares of these scores deviations represents the total variation observed in those raw scores obtained on the pre and post tests. Dividing by N-1 (where N is the size of the sample or 55) we get the variance of the scores. The second root of the variance is the standard deviation (S_D). The computed t value can then be calculated by:

$$t = \frac{(\bar{D})(\sqrt{N})}{S_D}$$

where $\bar{D}$ is the mean of all 55 differences
N is the sample size and
S_D is the standard deviation of the sample

for our sample $\bar{D} = 7.13$
$N = 55$
$S_D = 7.87$

and t computed $= \frac{7.13\ (\sqrt{55})}{7.87} = 6.72$

Our null hypothesis states that there is no significant difference between the two sample means, or that

$$\bar{x}_1 = \bar{x}_2$$

Thus if we reject our null hypothesis we in fact confirm our research question, that the skills course had a significant impact as measured by a pre-post test. To do this we must compare our computed t value (from the raw scores to some hypothetical t value extracted from a table of t values. That t value from the table is found by selecting an appropriate level of significance (.05) and computing the number of degrees of freedom for our sample (N-1 = 54).

$$t_{(.05,\ 54)} = 2.00 \text{ (for a two-tailed test)}$$

Since our computed t (6.51) exceeds our tabled t (2.00) we reject our null hypothesis. Thus a significant difference exists between the means of the two groups: in fact, the average post-score was significantly higher that the average pre-score. We can infer that the skills course has contributed to this significant difference.

IV. The Impact Model-Formative Evaluation

A more in-depth examination of those categories emphasized in the skills course can be conducted by simply breaking each student's pre and post scores into those eight aforementioned categories of instruction, and conducting a t-Test for each category. The results of such a breakdown are tabulated in figure 1.

Using a .05 cutoff for the acceptable level of significance we can see that the most significant impact of the course was due to those improvements in categories 3, 7, and 8:

Choice of Subject Headings
Choice of Indexes
Use of Periodical Indexes

If we place great faith in our test designs, we are led to infer that the remaining five areas of concentration and instruction did not have a significant impact on this sample of students. Particularly low in impact are the areas of literature reference sources and arrangement of subject headings. A review of the actual test indicated that perhaps the level of difficulty of these questions was such that not much of an improvement could be expected. Given the content of the skills course, and the examples covered, we found it possible that the students might have difficulties in identifying the correct answers to the questions. The solution was to redesign the substance of these questions so as to better reflect the content of the course for the two areas.

Two other areas of weak impact are those of terminology and card catalog usage. An examination of those mean scores before and after the course show that although the difference is small, both scores are above average. This means that many students entered the skills course with at least some prior knowledge about the first two areas, thus scoring well on the pre-test in these areas. Once a student scores in the eighty to ninety percent range, the climb to perfection becomes more difficult. For those two non-impact areas discussed previously (areas 4 and 5) the pre-test scores were in the fifty to sixty percent range, indicating much room for improvement.

The remaining area, sources of biographical information, was very close to being significant in terms of impact. Our predetermined level

Category of Skills	t Value	Level of Significance
I. Definition of Terminology	1.17	.247
II. Information from Card Catalog	1.59	.117
III. Choice of Subject Headings	2.13	.038
IV. Arrangement of Subject Headings	0.77	.445
V. Literature Reference Materials	0.37	.762
VI. Sources of Biographical Information	1.93	.059
VII. Choice of Indexes	4.37	.000
VIII. Use of Periodical Indexes	6.51	.000

Figure 1

RESULTS OF DIFFERENCE OF MEANS
FOR CATEGORIES OF SPECIAL EMPHASIS

of significance was .05 and the calculated level of significance for this category was .059. These scores, although not statistically significant, indicate that we are on the proper path in this area.

As an extra, a simple attitudinal response questionnaire was included with the post-test to provide a means of relaying information about the course back to the instructors. This feedback questionnaire (see figure 2) focused mostly upon overall attitudes with respect to the course. The tabulated results indicate that over seventy percent of those students enrolled in the bibliographic instruction course felt that they actually benefitted from the course and that they expect to reap even more rewards as their education continues. Over two-thirds strongly recommend other students should take a similar course in library skills.

V. Further Refinements and Conclusions

Certain changes in the course design and in the test design can be made in response to the evaluative study. The pre-post test could be redesigned so as to be a better tool for evaluating progress made in the course. The actual course content can be restructed so as to be more sensitive to those areas where student's prior knowledge regarding library skills is known to be minimal. Over a period of successive course offerings and evaluations it is hopeful that both the summative and the evaluative feedback mechanisms will lead to an improved, more viable course in bibliographic instruction.

This is the first year that the Library Skills Course (LS 105) has been taught, and we are very much interested in your feedback regarding the course. Please be candid in your answers.

1. How did you hear about the course? (Check all that apply)
   Summer Welcome____ Advisor____ Preregistration____
   Registration____ Other (please explain)_____

2. Have you had any prior instruction in how to use a library?
   No____
   Yes___ If you checked yes, please indicate where (Check all that apply)
   High school____ College____ Public Library____
   UMC (briefly state the nature of the instruction and how many years ago you received it)_____
   Other_____

3. What year in college are you?
   Freshman____ Sophomore____ Junior____ Senior____ Graduate____
   Other (briefly state)_____

For questions 4-9 please check one of the categories for each question asked. The categories range from 1 (not at all) to 6 (very much so); check category 0 if you are unable to answer the question.

	Don't know 0	Not at all 1	2	3	4	5	Very much so 6
4. Was this course (LS 105):							
useful?	___	___	___	___	___	___	___
a waste of time?	___	___	___	___	___	___	___
enjoyable?	___	___	___	___	___	___	___
repeating what you already knew?	___	___	___	___	___	___	___
5. Were the weekly homework assignments:							
useful?	___	___	___	___	___	___	___
difficult?	___	___	___	___	___	___	___
6. Have your library skills increased as a result of this course?	___	___	___	___	___	___	___
7. Do you feel comfortable in using Ellis Library as a result of this course?	___	___	___	___	___	___	___
8. Do you feel that this course has been or will be of help in your other courses?	___	___	___	___	___	___	___
9. Would you recommend this course to other students here at UMC?	___	___	___	___	___	___	___

Figure 2

FEEDBACK QUESTIONNAIRE